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FOR: Examiner Dexter Tugbang, Art Unit 3729

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FROM: Matthew J. Lattig

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COMMENTS:

PLEASE REVIEW THE FOLLOWING DOCUMENTATION.

THESE ARE THE DRAFTED PROPOSED CLAIMS TO DISCUSS DURING OUR INTERVIEW TODAY AT 2:00 P.M. FOR

US 09/497,993
BARBER ET AL.
ATTY DOCKET NO. 37310-000132/US

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DKHT 1- PROPOSED CLAIMS for
2 p.m. Interview

1. (Currently Amended) A method of producing an acoustic resonator device, comprising:
depositing a first metal film on a substrate;
patterning said first metal film;
depositing a continuous piezoelectric material layer on said first metal film which is not patterned;
depositing a second metal film on said piezoelectric material;
patterning said second metal film to form a complete acoustic resonator device; and
~~isolating said piezoelectric material by selectively removing some or all piezoelectric material not involved in signal transmission~~ after said acoustic resonator device is formed by a selective etching process to limit lateral propagation losses to un-etched regions of the formed acoustic resonator device ~~reduce an amount of acoustic energy which propagates in a lateral direction away from the device.~~
2. (Cancel) The method of claim 1, wherein said isolation of said piezoelectric material is performed during fabrication of the device.
3. (Cancel) The method of claim 1, wherein said isolation of said piezoelectric material is performed after fabrication of the device.
4. (Cancel) The method of claim 1, wherein said step of isolating further includes removing some or all piezoelectric material not involved in signal transmission after device fabrication to limit lateral propagation losses to un-etched regions of the device.
5. (Cancel) The method of claim 4, wherein said step of removing is performed by a selective etching process.

Claims 6-9 (Withdrawn)

10. (Original) The method of claim 1, wherein said piezoelectric material is selected from the group comprising at least AlN, ZnO and CdS.

11. (Currently Amended) The method of claim 1, wherein said first and second metal films are formed by lithographic patterning of Al metal or other conductors.

12. (Previously Amended) The method of claim 1, wherein said substrate is formed as a plurality of acoustic reflecting layers on a substrate such as a silicon, quartz, or glass wafer.

13. (Currently Amended) A method of isolating an acoustic resonator device, comprising:

depositing a first metal film on a substrate;

~~patterning said first metal film;~~

depositing a continuous piezoelectric material layer on said first metal film that is not patterned;

depositing a second metal film on said piezoelectric material to form a complete acoustic resonator device;

~~patterning said second metal film; and~~

removing some or all piezoelectric material not involved in signal transmission by a elective etching process that is performed after said acoustic resonator device is formed to limit device fabrication to limit lateral propagation losses to un-etched regions of the device, thereby limiting propagation of energy in lateral modes.

14. (Cancel) The method of claim 13, wherein said step or removing is performed by a elective etching process.

15. (Currently Amended) The method of claim ~~14~~13, wherein at least some of the substrate surface is removed by selective etching.

16. (Original) The method of claim 13, wherein at least some of the removed piezoelectric material forms a void which is back filled with a different material.

Examiner Tugbang: This suggested amendment is an attempt to further remove the claims from Brayman. Refer to our FIG. 4 and page 6, lines 16-28:

Referring to Fig. 4, there is an acoustic resonator device 200 comprising a substrate 220, and a piezoelectric layer 210 sandwiched by top and bottom metal electrodes 205 and 215. Since layer 210 is continuous (i.e., un-patterned), there is no direct electrical connection to the base metal (bottom electrode 215), and the acoustic resonator device 200 is actually two "cavities" or resonators formed in series. Further, the piezoelectric material within layer 210 is oriented so that an applied electric field will excite bulk acoustic waves, i.e., primarily longitudinal waves which travel perpendicular to the surface of the substrate 220. This mode of propagation differentiates these acoustic resonator devices of Fig. 4 from Surface Acoustic Wave (SAW) devices, where the material and design properties encourage acoustic wave propagation parallel to and along the surface of the substrate.

In Brayman, col. 6, lines 40-48, the piezoelectric layer 28 is subjected to patterning by sputtering through an aperture mask or via a dielectric liftoff process. We don't do that, we do not want to have a direct electrical connection to the bottom electrode, (first metal film), since that may encourage cross-device interference.

We want to inhibit interference, and to "force" propagation of energy laterally to the un-etched regions of our formed device. We do this by first fabricating the acoustic device, and then selectively etching it to ensure that this happens. Brayman does not suggest this at all. EerNisse, while arguably controlling the shape or location of a vibration region, does not specifically shape the device to "force" lateral propagation to un-etched regions.

Accordingly, Brayman does not even suggest the continuous (un-patterned) piezoelectric layer, thus there would still be interference even after selecting etching. EerNisse also does not suggest leaving the piezo layer un-patterned when forming the device. We think that these claims can at least get Brayman removed as the primary reference, or further define the invention over the combination. We ask that you please comment/agree with our proposed claims, or suggest other possible favorable amendments that we could make to move this case closer to allowance.